

## ABSTRACT

A system for transporting a high speed data stream over a plurality of relatively low bandwidth unshielded twisted copper pairs within the local loop plant or in any environment having a plurality of copper lines, such as on campuses, within large buildings, etc. The copper twisted pairs are transformed from a plurality of low bandwidth, low reliability links into a high reliability, very high bandwidth long range communication channel utilizing optimized xDSL transmission technologies over the plurality of copper pairs. A transmit data processor perform scrambling, FEC encoding and interleaving on the data before it is divided and dispatched to the plurality of modem elements for transmission over the local loop plant, either bidirectionally or unidirectionally. On the receiving side, the individual data streams are collected, aggregated and a receive data processor performs de-interleaving, FEC decoding and de-interleaving, resulting in the high speed data stream originally transmitted. The system also includes means for increasing the performance of the xDSL modem elements including crosstalk cancellation, power and PSD control, data rate control and optimal routing of the transmitted signals within the twisted pair binders. Network elements located remotely on the other side of the plurality of copper pairs are provided electrical power. In addition, the system optionally multiplexes a plurality of low bandwidth telephony services over the high speed link using either TDM or FDM techniques.

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